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FIRST AID
FOR THE
TRENCHES

AMERICAN EDITION

BY

SOMERVILLE HASTINGS

CAPTAIN R. A. M. C.

1917

HARVEY MILITARY SERIES

FIRST AID FOR THE TRENCHES

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By
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Preface by
MAJOR FREDERICK S. MACY, M. C., U. S. A.

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HARVEY MILITARY SERIES

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Preface

It has been demonstrated in previous wars, but especially in the present conflict, that the final result of casualties not immediately fatal nor inherently so depends upon the promptness and the intelligence with which first aid is administered upon the battlefield. Relatively few wounds are fatal if they do not kill outright; but failure to take the precautions or to adopt the procedures which experience has shown will prevent complications, notably infection, are the cause of death in many cases that might have been saved. It is important that these things be done at the instant of injury, for it is often several days before the injured can be removed to the rear, where alone it is practicable to perform life saving operations.

These principles are so generally accepted among military authorities that much study and inventive genius have been expended in devising ways and means so to render instant assistance, or to save life that the wounded ultimately reach the surgeon with their fight for life won in the beginning if, indeed, they still need him. Many cripples of past wars would still have the use of their arms or legs, for example, if a few drops of the tincture of iodine had been applied to their wound when it was inflicted.

Practically all armies insist upon instruction of troops in first aid, both for military and economic reasons. The volume submitted here is the work of a practical medical officer who has stripped it of all technicality and left only what even the most indifferent can readily understand. There is nothing in it that is not simple, effective and tried out, either in past wars or upon the field of today. It is not a text book nor represented as such. It is a quick, sure set of directions that cover about every emergency of battle, and in surprisingly few words. We hope that it will accomplish, in its own way, as splendid victories as the troops for whom it is intended.

MAJOR FREDERICK S. MACY, M. C., U. S. A.

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FIRST AID FOR THE TRENCHES

CHAPTER I

WOUNDS

Wounds in General

The three principal dangers which result from rifle, shrapnel, or other wounds are—

1. Shock.
2. Bleeding.
3. Poisoning of the wound.

(1) The vitality of a wounded man is lowered, especially at first. He must therefore be kept warm, and should be covered by an overcoat if such a thing can be obtained. Any movement increases shock. Therefore, when a man is badly wounded, *if he is not bleeding*, it may be useful to move him

to a dug-out or other place of safety and let him rest for an hour or two before removing him to the dressing-station. If he is conscious, and able to swallow, a little hot soup, tea, or coffee may help him. Where he is exposed to the enemy's fire he should of course also be assisted to cover whenever this is possible.

(2) *General Treatment of Wounds.*—It will be quite obvious to every one that the sooner bleeding from a wound is stopped the better for the person affected. But it may not be equally clear how important it is to keep away everything soiled or dirty from the neighbourhood of a wound. Wounds made by absolutely clean knives through skin which has been specially cleansed, and which are afterwards covered by absolutely clean dressings (as for instance operation wounds) generally heal well and quickly, but only a small proportion of the wounds made in war heal like this. The reason for this difference is, that the wounds of war are really poisoned wounds—that is, wounds containing disease germs which prevent them from healing readily and give rise to a thick discharge from them. We must do our best therefore to keep everything which has been anywhere near dirt of any kind, which is

sure to contain germs, away from the neighbourhood of wounds. But though all dirt contains germs and is therefore dangerous, some forms of soil are much more dangerous than others. Thus the virgin soil of South Africa contains relatively few disease germs, whereas the soil of Belgium and France, which has been cultivated and manured for generations, is full of some of the worst varieties.

Disease germs are such tiny things that they can only be seen with the strongest microscope, but they multiply very rapidly, and are possessed of such wonderful vitality that some of them have to be boiled for ten or fifteen minutes, or exposed to steam for the same time, before they are killed. Hence the surgeon boils his instruments before dressing a wound, and the dressings which he uses to cover it have generally been exposed to steam and then dried. Various chemical poisons will also kill germs. Carbolic acid is perhaps the best known of them, and the coloured gauze in your "first field dressing" contains another. A doctor will often wash out a wound with carbolic acid or something of the sort, and provided the wound is a fresh one this is very useful; but if it has been made some hours before, the germs will have multiplied in it and some of them will have got into the flesh around the wound, where they cannot be reached by the carbolic. All wounds therefore should be treated as soon as possible. In the recent war between Russia and Japan many of the Japanese sailors had carbolic baths and put on steamed clothes before going into action, so that any wounds produced might heal well. But if you have been in the trenches for long you can be quite sure that neither you nor your clothes will be anything like free from germs, and therefore any wound that you may get is very likely to be a poisoned one. Shell or shrapnel will also very probably carry soil or pieces of clothing directly into a wound.

If you are able, therefore, you should try and destroy the poisonous germs in the wound by pouring into it the tincture of iodine which you have in a glass tube. But in doing this you must be as careful as you can not to touch the wound with your hands, for these are sure to be covered with germs. For the same reason you should handle as little as possible the coloured gauze of your first field dressing which you next apply to the wound. Over this comes the piece of cotton wool, and then the bandage or a handkerchief (see Fig. 1) to cover all. The object of the dressing is to keep all germs and dirt from the wound, and it is useful to remember that no germs of any kind will pass through cotton wool so long as it is kept dry and is not soaked through by water or discharge. Even very slight wounds and scratches should be covered up at once by a bandage or a handkerchief to prevent dirt getting rubbed into them, and tiny wounds into which soil has got rubbed should be reported to the medical officer, because a wound containing soil from which the discharge cannot come away freely is liable to cause lockjaw. Lockjaw, though of course serious, is not necessarily a fatal disease, and a good many of those affected by it during the present war have completely recovered.

In connection with gunshot wounds it is necessary to remember that in many cases the bullet is not stopped by the body, but passes right through it. Two wounds have therefore to be looked for in all such injuries, and both must be treated with iodine and dressed as has been already described.

(3) *General Treatment of Bleeding.*—But in what way will our treatment have to be altered if there is severe bleeding from the wound? To properly understand this we must remember that the blood

is pumped round the body by the heart, which is really nothing more or less than a simple force-pump. The blood under high pressure is conveyed round the body from the heart by the arteries, and it is collected again and travels back to the heart in the veins. The veins are more numerous than the arteries, and are generally nearer the surface, and the force of the blood is much less in the veins. Bleeding from a cut vein is usually quite easily stopped by firm pressure, though blood may be flowing very freely. A wounded man should be kept as still as possible till all bleeding has stopped, because movement stimulates the heart to pump the blood more vigorously round the body, and this naturally increases the bleeding.

(*a*) Bleeding from a Limb

Now if there is free bleeding from a wound, what shall we do? Everything will depend whether the bleeding is from a *limb*—that is, an arm or leg—or from the *trunk*, by which we mean the head, neck, chest, stomach, shoulder, or hip. If the wound is of one of the limbs it is usually best to make no attempt to purify it, but at once to raise the injured part, getting the soldier to sit or lie down (especially

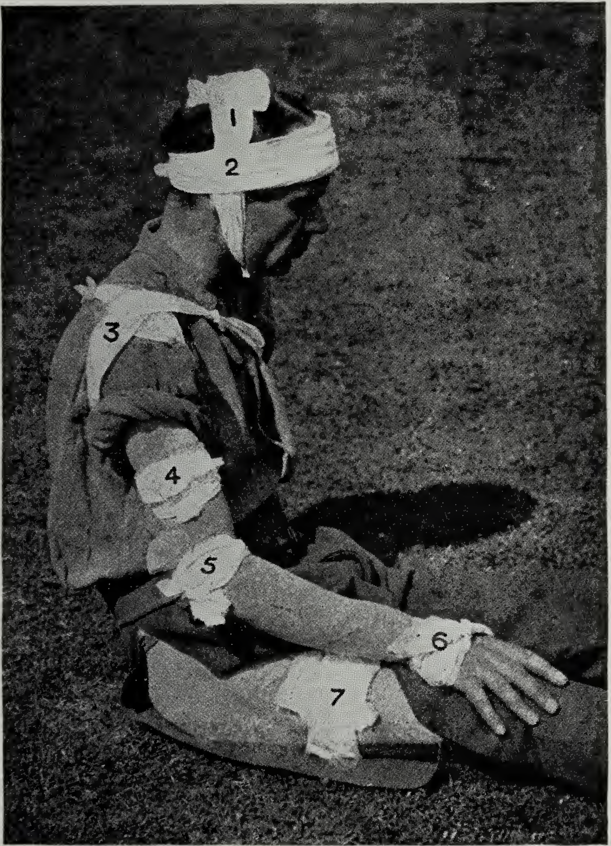

Fig. 1.—Handkerchiefs applied as Bandages for Wounds of (1) Head, (2) Forehead, (3) Shoulder, (4) Arm, (5) Elbow, (6) Hand, (7) Thigh.

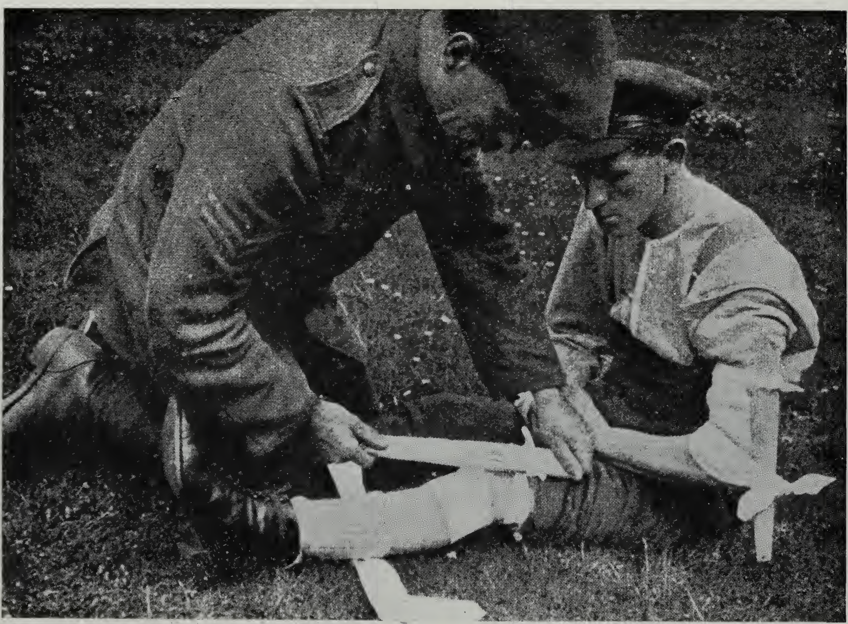

Fig. 2.—Tourniquets on Arm and Thigh.

if the leg or thigh be wounded), and cover it with the coloured gauze of the first field dressing, putting the cotton wool on top of this and bandaging as tightly as we can. Will this stop the bleeding? If the blood is coming from the veins it certainly will, but if the bleeding is from a large artery the bandage may be soaked through and the wound may continue bleeding. What is to be done now? We must tie something tightly round the limb between the wound and the trunk to press on the arteries conveying blood to the wound. And the easiest way to do this is by means of what is called a *tourniquet* (Fig. 2).

Take a handkerchief, which need not be clean, or a piece of bandage or puttee, or failing this use a webbing strap, or tear a strip, about two inches wide and long enough to go easily round the limb, from a coat or shirt. Tie this tightly round the limb—on the body side of the wound and an inch or two from it—with a double knot. Next tie a bayonet-sheath, a short stick or piece of ration-box, near one end with a second double knot, and at once begin to twist this round and round to tighten up the loop round the limb. Even though it is rather painful do not give up twisting till the bleeding has stopped. Then tie the other end of the bayonet-sheath, or whatever you make use of, to the limb, with another handkerchief or piece of string to prevent its untwisting. The tourniquet must be twisted tight enough to stop bleeding even though it causes pain. After all bleeding has ceased it is sometimes useful to remove the dressings from the wound without touching the tourniquet and to purify it by pouring in iodine tincture.

The question is sometimes asked "How long may a tourniquet be left on a limb ?" Seeing that the tourniquet cuts off all the fresh blood from the limb beyond it, the tourniquet must not be left on too long or the part will die. The arm can manage without blood fairly well for as long as three hours, but there is danger in leaving a tourniquet round the lower limb for more than half this time. *Therefore, when a tourniquet is applied skilled help must be obtained with as little delay as possible.* Where this is impossible it is best after an hour to loosen the tourniquet a little, being always ready however to tighten it up again if bleeding starts afresh.

The proper treatment, then, for bleeding from a limb is to apply a pad and bandage, and to raise the bleeding part ; and should this fail to stop it, to put on a tourniquet above the wound.

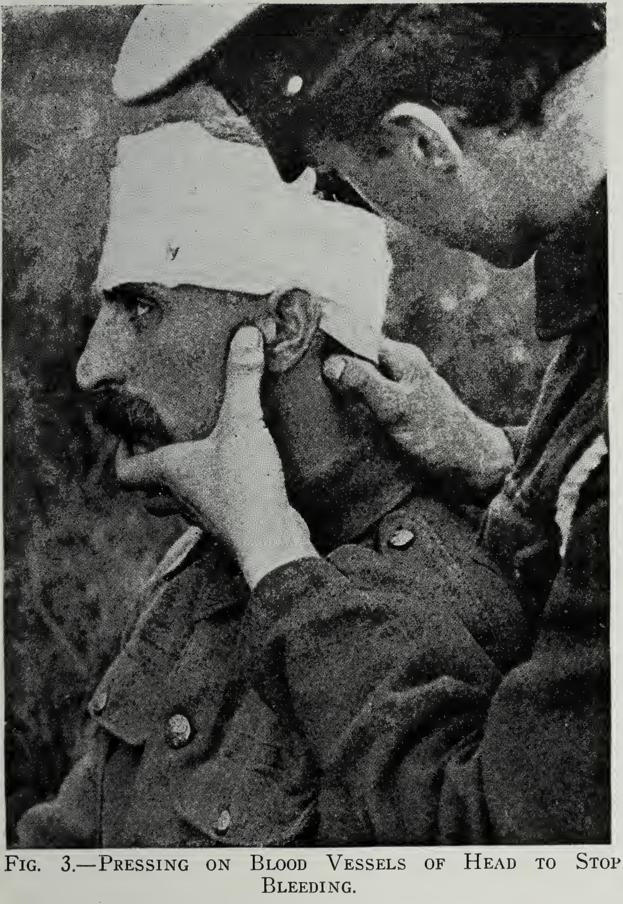

FIG. 3.—PRESSING ON BLOOD VESSELS OF HEAD TO STOP BLEEDING.

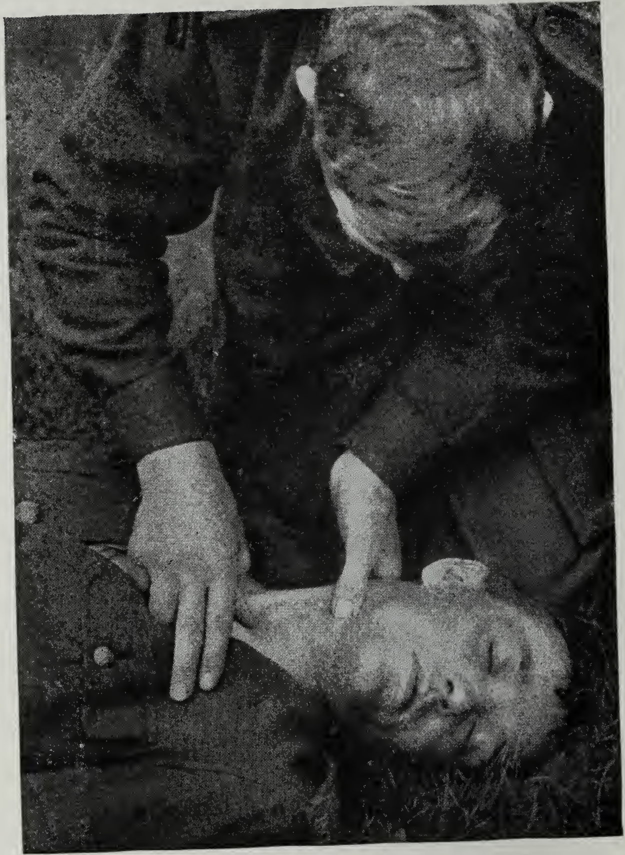

Fig. 4.—Pressing on Blood Vessels of Neck for Wound of Neck (Wound not shown).

(*b*) BLEEDING FROM THE TRUNK

From the Head.—With a severe wound of the head the skull is often broken. Firm pressure by a pad and bandage is therefore liable to press a piece of bone into the brain, and is to be avoided. It is better to stop bleeding by pressure on the arteries going to the part. For bleeding in the front half of the head press with the thumb just in front of the ear of the side of the head injured (Fig. 3); for the back half press two inches behind the ear and a little below, using the thumb as before (Fig. 3). The beat of the artery can generally be felt in the former, but very rarely in the latter situation.

Face.—Though a wound of the face may bleed freely, this is easily stopped by a pad of dressing pressed firmly on the wound and held in position by the hand.

Neck.—A wound of the neck is one of the most serious in the body, because large arteries and veins exist on either side of the wind-pipe. It is of course impossible to put a tourniquet round the neck, as this would cause suffocation. The proper thing to do is therefore to press on the blood vessels on each side of the wound. The artery and vein run together side by side, and if one is wounded the other is almost sure to be injured as well, and the result is that the artery carrying blood from the heart will bleed chiefly from the body side of the wound, while the vein will bleed from the head side. Fortunately it is rare for both of the main arteries which are situated one on each side of the wind-pipe to be injured at one time, for it is very dangerous to press on both at once to stop bleeding, as this cuts off nearly the whole of the blood from the brain.

When the neck is wounded and bleeds freely, kneel down on the wounded side of the patient, who will be lying down, and put the tip of each of your thumbs so that it just touches the wind-pipe, one on each side of the wound and about an inch from it, and then press straight back on to the spine (Fig. 4). If this does not stop the bleeding shift the position of one or both thumbs a little and try again. In most cases you will have to keep the patient just where he is, and go on pressing till skilled help arrives. If the wind-pipe is injured try to turn the patient into such a position that any blood that may trickle into it will run out again at once.

Chest and Back.—Cover the wound with dressings and press firmly with the hand. Where the patient coughs up blood as the result of the lung being also injured, he should lie on the injured side, so that the opposite lung is most used for breathing. He should be covered up and kept warm and as still as possible.

Stomach.—Wounds of the stomach rarely bleed much externally, but they are none the less serious, because, if severe, they are very liable to become poisoned from the bowel. The person affected should be kept warm and move as little as possible, and must on no account walk. If the bowels are protruding through the wound they should not be pushed back, but should be covered by the coloured gauze from the first field dressing. If obtainable a clean handkerchief should be placed over this, and then the sides of the tunic should be brought together over both and fixed with pins; or, if they will not meet easily, the opposite buttons and button-holes can be tied together with string. If the wound is deeper than the skin no iodine should be applied. The knees should also be bent up and the shoulders raised on a folded coat to loosen the wall of the stomach and prevent pressure on the injured organs. After bullet wounds and other injuries to the stomach *give nothing to eat or drink*, move very carefully, and inform the medical officer as soon as possible.

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Shoulder.—For bleeding from the shoulder and upper arm, too high up for a tourniquet to be applied between the trunk and the wound, place a pad of dressing on the wound and hold it there, pressing firmly. When all bleeding has ceased the hand may be replaced by a folded handkerchief, which is firmly bandaged into place (Fig. 1); but if the bleeding starts again we must press on the wound once more. If, however, pressure *on the wound* is not enough to stop the bleeding, press the thumb just behind the middle of the collar bone, where the beating of a large artery may be felt, and hold it there till skilled help arrives (Fig. 5).

Hip.—For bleeding from the thigh too high up for a tourniquet to be applied, pressure by means of a pad of first field dressing, pressed firmly on to the wound, should first be tried. If this fails, or if immediate swelling around the wound occurs, we must press on the artery going to the part. The artery is situated a little to the inner side of the middle of the front of the thigh, but it is sometimes difficult to feel its beat. The two thumbs should be placed one over the other in the situation of the artery and pressed directly backward (Fig. 6). If the bleeding does not at once get less, move

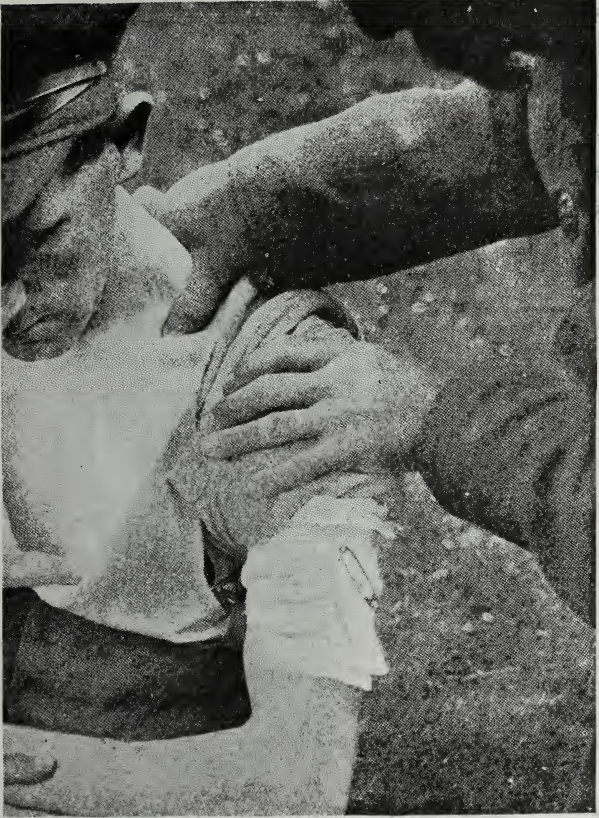

FIG. 5.—PRESSING ON BLOOD VESSEL BEHIND COLLAR BONE FOR BLEEDING FROM WOUND OF SHOULDER.

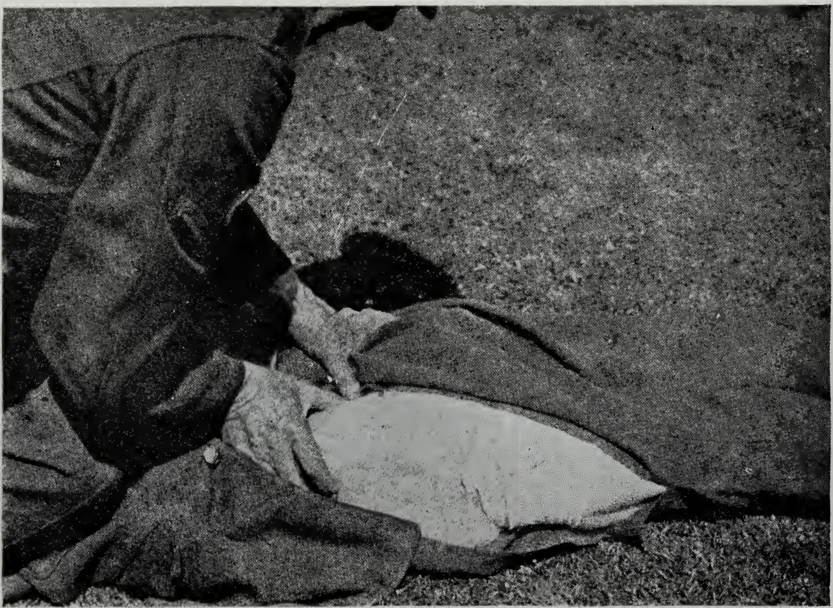

Fig. 6.—Pressure on the Artery in the Groin for Bleeding from Wound of Upper Part of Thigh.

the thumbs a little to one or the other side and then press again.

Sometimes bleeding from *a wound in the mouth* can be stopped by direct pressure of the finger, covered with the coloured gauze from the first field dressing, on the bleeding area in the man's mouth. If this is not successful, pressure on the blood vessels of the neck (Fig. 4), on the same side as the wound, should be tried, and the wounded man turned on to his side so that any blood flows out of his mouth instead of running down his throat.

Bleeding from the nose from injury or disease can generally be stopped by pressing the two sides of the nose together with finger and thumb as far back as can be reached, and holding it thus for ten or twenty minutes. If, however, while this is being tried, blood flows down the throat and is swallowed, or is spat out from the mouth, the treatment is useless and should be discontinued. The patient should then lie on his side so that the blood flows out from the nose and does not run down the back of the throat.

There is no special first-aid treatment for *vomiting of blood* from an injury to the stomach, beyond keeping the patient lying down at rest and as warm as possible.

Bleeding into a Limb.—Sometimes a rifle bullet may pass into or through a limb, causing injury to a large artery, but tearing the rest of the limb very little. Blood will be poured out, but may be prevented from reaching the surface owing to swelling along the track of the bullet; or the sharp end of a broken bone may cut into an artery. In either case there will be a sudden swelling of the limb, which rapidly becomes larger. This must be treated at once by applying a tourniquet on the body side of the swelling; or if this is impossible, as in the case of the shoulder and hip, by pressing on the artery going to the part (see page 12).

Wounds of *joints* are liable to be very serious if dirt gets into them. Every care should be taken to prevent this by the early application of the first field dressing, and soldiers thus wounded should be moved to the nearest dressing station as soon as possible. As iodine is liable to cause inflammation of a joint, care should be taken to apply it only to the skin around, and to try and prevent any running into the joint itself,

CHAPTER II

BROKEN BONES

Bones may be broken by shell- and rifle-fire as well as by blows and falls.

When a bone is broken and there is no wound near, the break or fracture is called *Simple*; but when there is a wound leading down to the break in the bone, the fracture is said to be *Compound*. It is quite clear that compound fractures are by far the worst sort, not only because the wound is liable to become poisoned, and a poisoned wound of bone is often very serious, but also because, quite apart from any question of poisoning, a compound fracture usually takes nearly double as long as a simple one to heal. When a bone is fractured the broken ends are generally very sharp, and are liable, if the limb is moved, to cut through the skin to the outside, making the fracture compound, or to injure some nerve or blood vessel, in the latter case causing a rapidly increasing swelling of the part from blood being poured out (see page 14).

In the treatment of a broken bone the main thing is therefore to move the part as little as possible; and if it has to be moved, to *first fix the broken bone so that no further injury may take place.* In most cases it is quite easy to say if a bone is broken, and in cases of doubt it is always best to proceed as if there were a fracture. Conclusive evidence that a bone is broken is given by either of the following indications:

(1) The injured limb is shorter than the other; or
(2) A bend is seen in the limb where no joint exists; or
(3) On gently moving the limb the two pieces of bone are felt to grate on one another.

Where there is a wound as well as a broken bone the wound must first be bandaged up before the broken bone is dealt with (see page 4); and of course, if there is bleeding, this must be stopped first of all (see page 6). When the fracture is compound—that is, where there is a wound through the skin leading down to the broken bone—and when there is severe bleeding from this wound, it

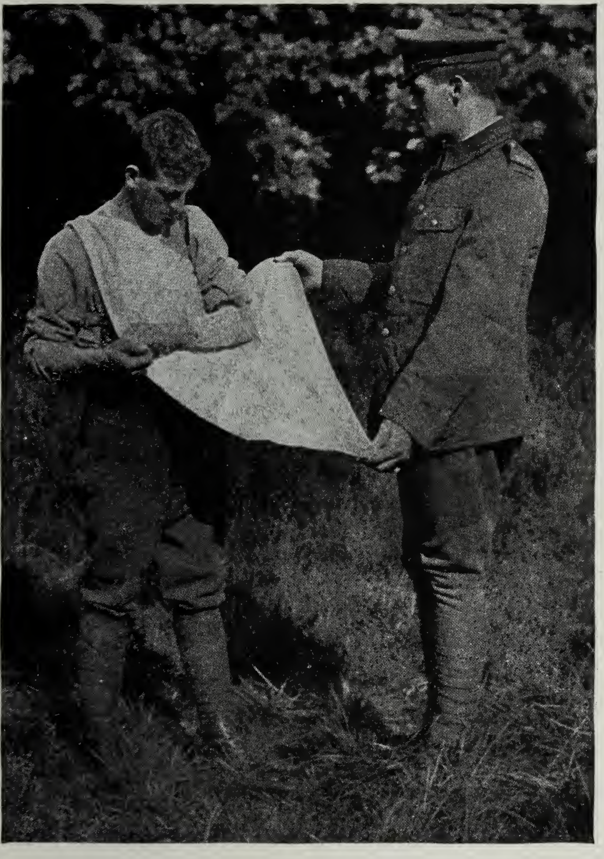

FIG. 7.—LARGE HANDKERCHIEF SLING—FIRST STAGE.

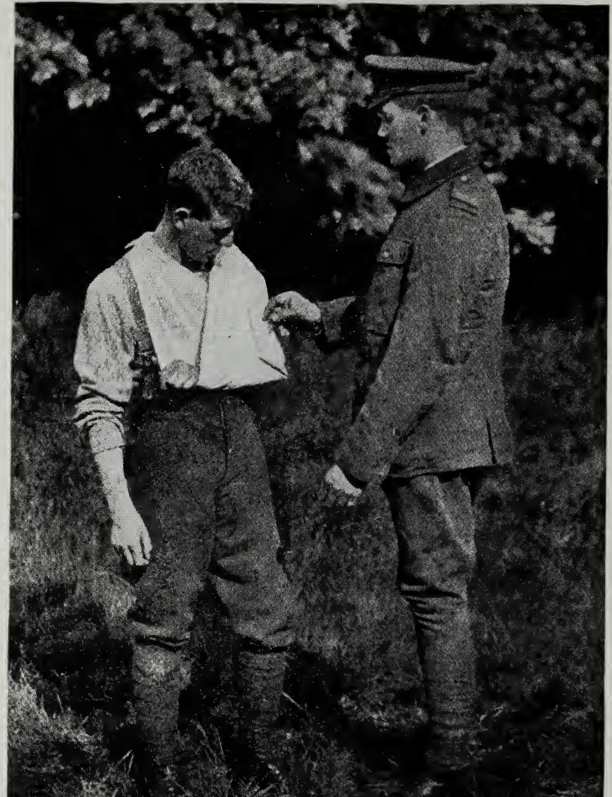

FIG. 8.—LARGE HANDKERCHIEF SLING—COMPLETE.

may sometimes be dangerous to press on the wound and bandage it up tightly to stop the bleeding, for fear of making a sharp piece of bone injure important structures. It is better in such a case to put a tourniquet (see page 7) round the limb between the wound and the body and tighten it up; or, if the wound is too near the shoulder or hip for this, to press on the artery supplying the part (see page 12).

And now having stopped any bleeding there may be and bandaged up the wound if one exists, how shall we fix the broken bone before moving the injured man? If a bone of the *Upper Extremity*, or the collar bone, is injured, it will in most cases be sufficient to put the injured arm in a sling. This can be made (1) by taking a large square handkerchief and folding it across the middle to make a triangle of half the size. One of the more pointed corners is then placed over the shoulder of the injured side, with the "square angle" under the injured elbow (Fig. 7). The other pointed corner is then brought over the shoulder of the opposite side, and both pointed corners are tied together behind the neck, care being taken not to pull up the elbow in so doing (Fig. 8)—the object being to support the forearm but not to raise it. (2) Or the sleeve can be pinned to the tunic with a safety-pin (Fig. 9); or (3) if an overcoat is being worn the lower part of it on the injured side can be turned up over the forearm and fixed to the breast by one or two safety-pins (Fig. 10). Having in this way supported the forearm in a sling, a large handkerchief or belt tied loosely round the body and the elbow of the injured side will help to prevent further injury when the patient is moved. Nothing in the way of a splint is generally required in fractures of the upper limb, but where the forearm (or arm below the elbow) is much injured it may be supported on a bayonet scabbard and fixed to it by a couple of handkerchiefs, one on each side of the injury, before being put into the sling.

When a bone of the *Lower Limb* is thought to be broken it is best to turn the wounded man on his back, straighten out the injured limb by firmly and steadily pulling on the foot, and then lay an unloaded rifle along the outer side of the injured limb, with the butt-end in the arm-pit (Fig. 11). The rifle is now fixed to the body, thigh, and leg. To carry this out, a belt tied round the butt-end and chest does very well, but must not be pulled too

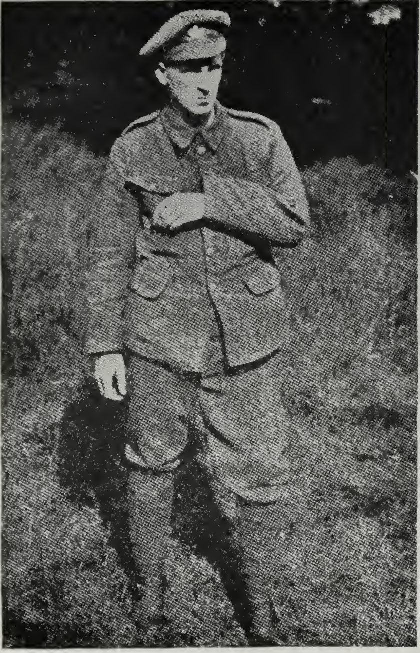

FIG. 9.—THE SLEEVE SLING.

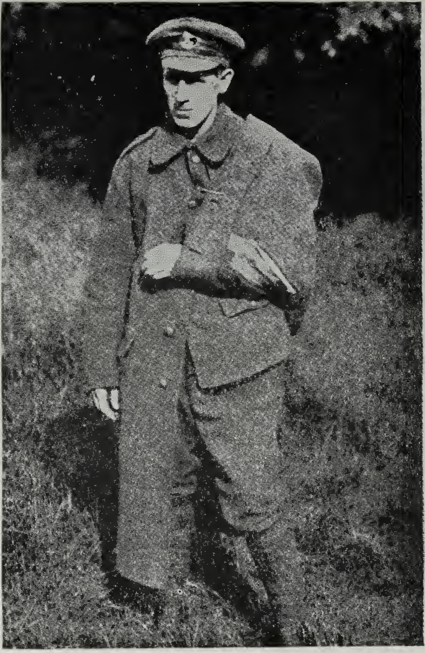

FIG. 10.—THE OVERCOAT SLING.

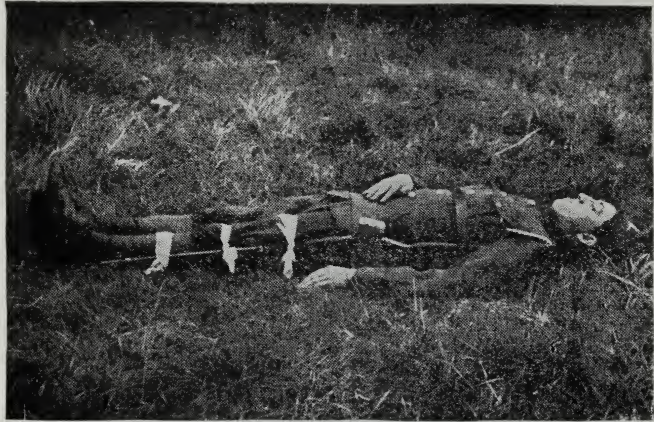

FIG. 11.—RIFLE SPLINT FOR FRACTURE IN LOWER LIMB.

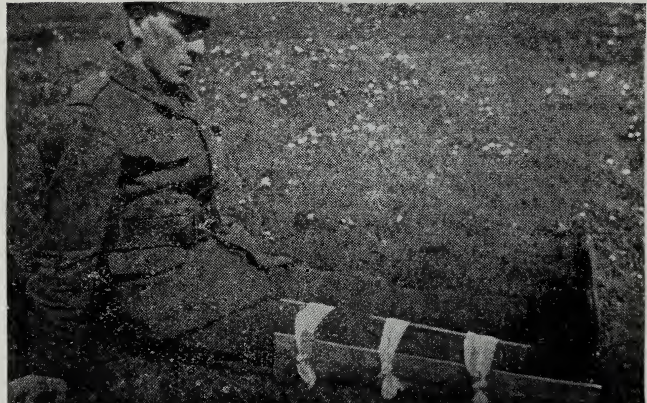

FIG. 12.—A BROKEN LEG TREATED BY TWO PIECES OF RATION-BOX.

tight. Another belt round the rifle and hips, a little below the waist, should be strapped up as tightly as possible. Three other straps, handkerchiefs, bits of bandage or puttee, or even bits of strong string, are put round to fix the rifle to the middle of the thigh, the knee, and the ankle. A soldier with a broken thigh bone fixed up in this way was able to return to his own lines, a distance of three miles, by crawling slowly on his back by means of his elbows and the sound leg.

Where the leg is broken below the knee a couple of shorter splints, such as two bayonet sheaths, one each side, or two pieces of ration-box, are generally sufficient if a rifle cannot be obtained (Fig. 12). Where no splints are available, tying the two legs together in three or four places does fairly well, provided that the uninjured one is kept quite straight. A bandage fixing both legs together or fixing a limb to a splint must never be put on so as to cover a wound.

SPECIAL FRACTURES

Broken Wrist.—In putting one's hand out to save oneself from a fall the wrist is often sprained and fairly frequently broken. When the bone is broken one part is commonly jammed into the other by the force of the fall (impacted fracture), and they are held fast. A broken wrist is therefore very like a sprained wrist; both are swollen, and though movement is painful, in neither case is the limb absolutely useless. As the two conditions are so much alike it is always wise to get the medical officer to look at any injury of the wrist.

Broken Thigh Bone.—In most cases it is quite easy to recognise when the thigh bone is broken. The limb is quite useless, it appears to be shorter than the other, and the foot is turned outwards so that it lies with the little-toe side on the ground. If the limb is moved grating will be felt. When the fracture is near the upper end, though the limb is useless, there is little shortening. And when, as happens fairly often, the two pieces of bone are also jammed together and held fast (impacted) the limb can be moved and the person affected has even tried to walk. This is of course a very dangerous thing to do, because the two pieces of bone may become suddenly separated and the sharp end of one of them may cut its way into a large blood vessel or do other serious damage. It is therefore necessary to recognise a fracture of the thigh bone both when the two pieces of bone are jammed together (impacted) and when they are not. We find the man lying with his foot turned out and we may first try very carefully to turn it in. If this can be done, but we feel a grating, we are dealing with an ordinary fracture. If the foot cannot be turned in without much force we have an impacted fracture. In all cases where a broken thigh bone is suspected, the injured limb is fixed to a rifle splint as previously described (see page 18), or both limbs are tied together.

Broken Knee Cap.—When the knee cap is fractured the ordinary signs of a broken bone are absent. There is no unusual bending of the limb, it is no shorter than its fellow, and no grating is felt when it is moved. The limb can, however, only be moved with difficulty, and the patient is unable to walk. When the knee cap is broken right across, the two parts are pulled away from one another by the muscles, and a finger gently laid on the knee cap feels a depression between the two pieces of bone. A long splint (*e.g.* rifle or piece of board from a ration-box) should be placed beneath or to the outside of the limb and fixed to it by handkerchiefs or bandages. The injured man should be kept lying down.

Broken Spine.—Injuries to the spine by blows, falls, shell- or rifle-fire are always serious, and a person thus injured should not be moved until skilled help arrives unless this is absolutely necessary. While a man with a broken spine is being lifted on to a stretcher (see pages 39, 40) it is desirable for some one to gently pull on his shoulders and a second person to pull against him by holding the patient's feet so as to straighten out the body and prevent overlapping of the spine and consequent injury to the spinal cord. Where such a thing can be obtained a shutter or door is even better than a stretcher for the removal of a patient with a broken spine, as it keeps him more rigid. If a man with an injury of the spine has to be moved a short distance to cover, and only one man is available, this can be carried out by clearing away all obstructions and then slowly pulling him by his shoulders, keeping the body as straight as possible all the time.

A broken *Hip Bone* or *Haunch Bone* causes much the same symptoms as a broken spine (see above), and is nearly as serious. Great pain is produced when the injured man moves his legs or when the hip bone is pressed on. The soldier must not attempt to crawl or walk, but must be moved in

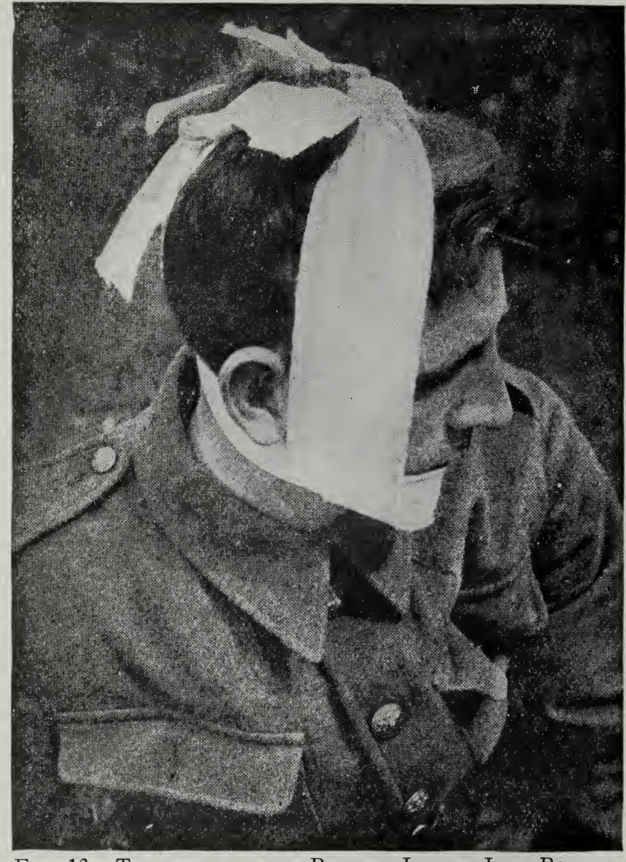

FIG. 13.—TREATMENT OF A BROKEN LOWER JAW BONE BY TWO PIECES OF BANDAGE.

the same way as one with a broken spine, except that there is no need to pull on the head and feet.

Broken Skull.—A broken skull does not often itself call for immediate treatment. (For treatment of the unconsciousness that generally accompanies it, see page 25.) When there is a scalp wound as well, and there is severe bleeding from it, it is better to stop bleeding by pressing on the arteries going to the part rather than on the wound itself (see page 9).

When the lower part of the skull (base) is fractured, as may sometimes occur, from a blow on the top or side of the head or a fall from a height, there is often bleeding from one or both ears, which may continue for hours. A piece of coloured gauze from a first field dressing should be put over the bleeding ear and fixed loosely in position with a bandage, but no attempt must be made to check the bleeding by tightly plugging the ear, as this may cause the blood to collect inside the skull and press on the brain.

When the *Lower Jaw* is broken, the teeth are irregular, and there is bleeding into the mouth. The wound, if there is one, should be dressed (see page 4), and the jaw closed and supported by two pieces of bandage, each about a yard and a half long (Fig. 13). One goes round the chin to the back of the neck, the other from below the chin to the top of the head. Each is tied loosely, and the four ends are then tied tightly together.

There is no urgency about the treatment of *Dislocations* and *Sprains*. As there is no sharp piece of bone to cause further injury it is sufficient to allow the limb to remain in any position that is comfortable to the patient. If it gets moved in reaching cover or going to the dressing station great pain may be produced, but very little damage will occur. To lessen the pain use a sling (page 17) for the upper limb, and fix the lower limb to a rifle along the outer side (page 18), or tie both legs and thighs together with several handkerchiefs or bandages. It is useful to remember that while fractures may take place anywhere in a limb dislocations and sprains can only occur at joints.

CHAPTER III

UNCONSCIOUSNESS—SUFFOCATION—BURNS

Unconsciousness

It is very important to have a clear idea of what ought to be done when a person is found unconscious. To stand him up on his feet and pour spirits down his throat are the very last things that should be attempted. A soldier who is found unconscious may be stunned from a blow on the head or a fall, may be suffering from shock from injury or loss of blood, may have fainted, may have had an epileptic fit, may be drunk, poisoned, deeply asleep, or may be suffering from a large number of other affections. Only the first three of these, however, deserve special notice here.

Unconsciousness from Concussion or Stunning.— The man will usually seem to be deeply asleep, and will generally look pale and be breathing quietly. He may remain in this condition for many hours, or the unconsciousness may only last a moment or so and the person feel all right or only a little dazed after it. While the unconsciousness lasts the patient should be covered up and kept as warm as possible; he should be lying down, and on no account should anything be given him to drink. When he comes to himself—even though the stunning may have only lasted for a moment—*as complete rest as possible for some hours, and the avoidance of stimulants of all kinds are essential,* for the following reasons. The blow or fall which causes the unconsciousness not infrequently also injures some small blood vessel in, or on the surface of, the brain. If the man remains quiet, but little blood may be poured out from the injured blood vessel—enough only perhaps to give rise to a slight headache—but movement or alcohol or tea or coffee may stimulate the heart to drive the blood more forcibly round the body, and sufficient may be shed to produce a return of unconsciousness or even death from pressure on the brain by blood which the firm resisting walls of the skull prevent from escaping. Hence we have the *rule of complete rest, warmth, and no stimulants* during the unconsciousness that results from stunning and for some hours after, and it is a rule that applies to unconsciousness from many other causes as well.

Unconsciousness from Shock from Accident or Loss of Blood.—Any severe injury is, as a rule, accompanied by a condition of weakness called shock. The condition generally lasts for several hours, and the person affected may or may not be unconscious. Although looking deadly pale and feeling far too weak to move, he may know all that is going on. The most important thing in the treatment of shock is to warm the sufferer and to keep his head low, so that there may be an abundant supply of blood for the brain. Therefore lay the patient down—and it is better to put him on his side if this can be managed—and cover him up with any extra clothing that you can get hold of. Any wound or bleeding will of course be dealt with, and when the patient has recovered consciousness and can speak he can be given a little cold water to drink if he is thirsty, and, provided all bleeding has stopped and there is no injury to the head, a little hot soup or other stimulant will do no harm.

In *Fainting* there is always unconsciousness, and the condition further differs from shock in that a fainting fit only lasts a few minutes, while shock lasts for hours. Bleeding, pain, fright, and many other conditions will make a person faint, the essential cause in all of these being a deficient quantity of blood going to the brain. The proper treatment therefore follows at once: increase the blood supply of the brain, by lowering the head between the knees if a patient looks or feels faint (telling him what you are doing), or by sipping cold water, which stimulates the heart; or if the man has already fainted, by keeping him lying flat till he recovers, and if this does not take place in a few minutes, by raising the legs and feet a little so that the blood in them may run towards the brain.

As has already been mentioned, there are many conditions which produce unconsciousness besides the three just described. It is desirable therefore to know how to proceed should we find an unconscious person and be unable to find out why he is unconscious. What to do is very simple. If there are wounds or bleeding first deal with these; then keep the man lying down flat with his head low, and if compelled to move him still keep him in this position. Keep him warm, and on no account give him any stimulant at any time nor anything to drink at all while he is unconscious. If he should start being sick turn him on to his side.

Suffocation

In modern warfare suffocation is apt to be produced in two ways: (1) *Through the falling in of a trench or the explosion of a mine*; and (2) *By the use of poisonous gases.*

(1) If you watch a man lying asleep who is breathing deeply you will notice that the chest and stomach rise with every breath that is taken. When we breathe the chest is made bigger by the action of the muscles, and air is drawn in to fill up the otherwise vacant space. As the chest enlarges downward the stomach is pressed on, and therefore bulges in front. If the chest and stomach cannot expand no air can be drawn in; that is to say, we cannot breathe, and so must die. Therefore, if a trench falls in, and you cannot get out, try to press out with your elbows to keep the pressure of the soil from your chest and stomach. Also in digging out any one partially buried get the chest and stomach free first and never mind about the limbs till later. If now the man does not begin to breathe, his mouth must be cleared of dirt with the fingers and his tongue seized and pulled out sharply two or three times, If this does not make him breathe, *Artificial*

Respiration should be at once started. Schäfer's method (Figs. 14, 15), the simplest, is as follows: Clear the mouth and pull the tongue forward. Loosen the tunic and belt. Turn the patient face downwards on the ground with the legs straight, one arm to the side and the other bent above the head so that the forehead rests on the forearm. This prevents the mouth and nose being stopped up by resting on the ground. Next place a folded coat beneath the pit of the stomach and kneel astride the man and spread out your hands flat on each side of the lower part of the back, so that the thumbs touch in the middle line and the fingers rest on the lower ribs (Fig. 14). Slowly bend forward while you count three, at the same time evenly pressing with each hand *inwards, downwards, and forwards* (Fig. 15). Rather suddenly let go the pressure without moving the hands while you come up straight again and count two. These movements must be repeated twelve to sixteen times a minute, pausing every three or four minutes to see if the man starts breathing again himself. They are to be carried out steadily and evenly, while the limbs are rubbed upward toward the trunk by other men if available. It is worth while to con-

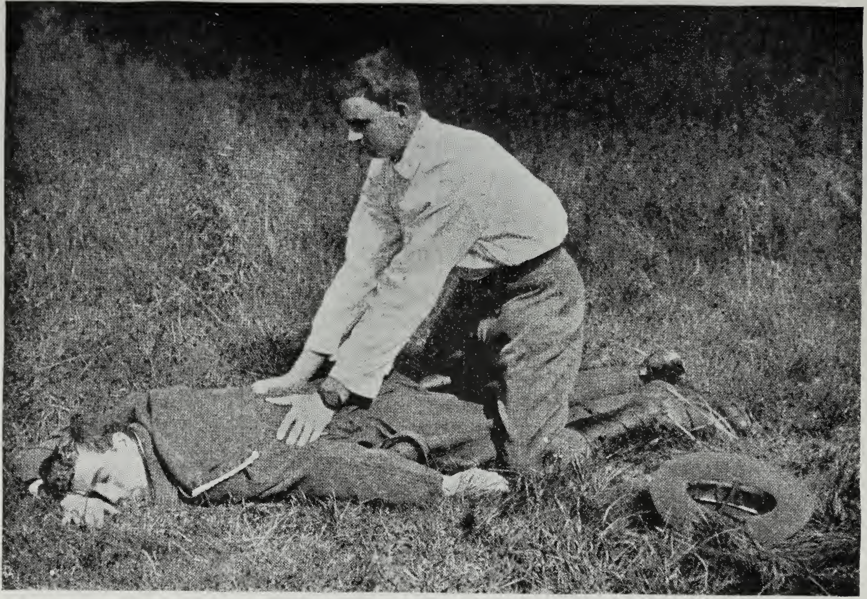

Fig. 14.—Artificial Respiration—First Stage.

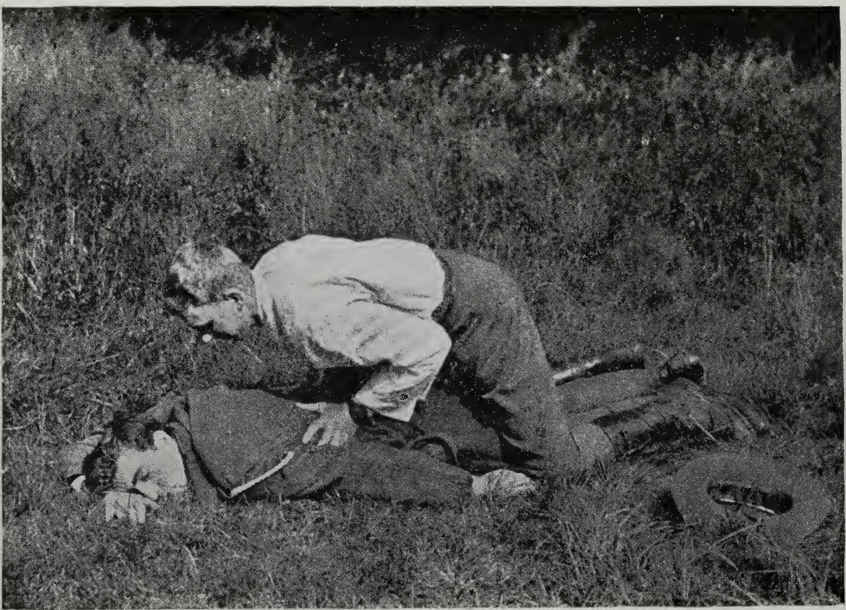

Fig. 15.—Artificial Respiration—Second Stage.

tinue artificial respiration for at least half an hour, if the man does not start breathing, before giving up the case as hopeless.

(2) Poisonous gases cause suffocation because they irritate the throat and lungs. The gases used are all heavier than air; it follows therefore that you will be breathing purer air when you are standing up, and that after the attack is over the air in the bottom of trenches and dug-outs may still be dangerous. If you use your gas-helmet or respirator properly, tucking it well down under your tunic, and tying it round your neck with a handkerchief if time permits, and it is unbroken, you can take no harm, although you will very likely feel a little shortness of breath and feeling of suffocation for the first few minutes that you are wearing it. A gas-helmet is most likely to get injured around the eyepieces and rubber valve, both of which should therefore be carefully examined at each inspection, so that defective helmets may be withdrawn and replaced by new ones. A thin flat piece of wood carried in the satchel with the respirator will help to prevent bending and consequent injury to the eyepieces. If the respirator is torn or one of the eyepieces broken, hold it tightly over the mouth and nose

with the hand. If you have no respirator a moistened handkerchief tied tightly around the mouth and nose is the best substitute.

When a gassed patient is gasping for breath it will often help him to make him sick. Try tickling the back of the throat with the finger, or if they can be obtained two tablespoonfuls of common salt or one tablespoonful of mustard, taken in just enough water to wash them down, will often produce sickness and relieve the man considerably. When the soldier has stopped breathing, Artificial Respiration (see page 30) may be tried, but is not very likely to be successful. Wounded and gassed men should on no account be allowed to remove their helmets until the trenches are free from gas. It is also of the greatest importance that men who have been gassed, even only slightly, should not walk about, but should keep as still as possible for several hours after the attack, because heart weakness and even heart failure sometimes result from gassing, but do not show themselves for some hours.

BURNS

The Germans sometimes attack behind jets of burning petrol or other inflammable liquid. Under pressure these jets will extend several yards in front of the man who is carrying the inflammable material. It is useful to remember, however, that one man can only carry enough to last for a very few minutes, and secondly, that as fire always travels upwards, if you lie down or bend down you are much less likely to be injured.

Burns and Scalds are best treated by moistening the coloured gauze from the first field dressing and applying it to the burns. Next cover this with the waterproof in which the dressing was packed, and then bandage it in position. Or if the coloured gauze cannot be obtained a clean wet handkerchief will do nearly as well. When a man is badly burned he generally suffers from severe shock. Keep him lying down therefore, and cover him up to get him warm. Unless this is absolutely necessary make no attempt to move him until he is feeling better.

CHAPTER IV

ON MOVING INJURED PERSONS

(*a*) *One soldier* can assist in the removal of another who has been injured in the following ways .

(1) *The Human Crutch* (Fig. 16).—Get the injured person to stand up. Then stand beside him and put your arm nearest to him round his waist. Tell him to put his arm round your neck and hold it with your other hand. You can then help him to walk and support him if he is faint. The method is suitable for any injury of the arm or foot, but not for a broken leg. Stand on the same side as the injured foot, but on the opposite side to an injured arm.

Should the injured man become too weak to walk (Fig. 17), remove your arm from around his waist and move in front of him, keeping his arm over your shoulder and holding it in this position. Now bend your knees a little, and as you rise bend for-

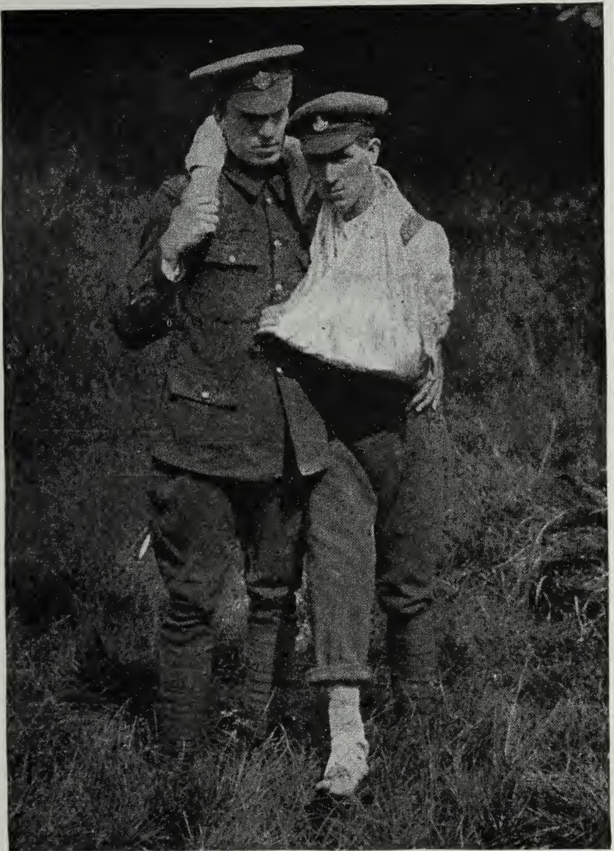

Fig. 16.—The Human Crutch—Ordinary Position.

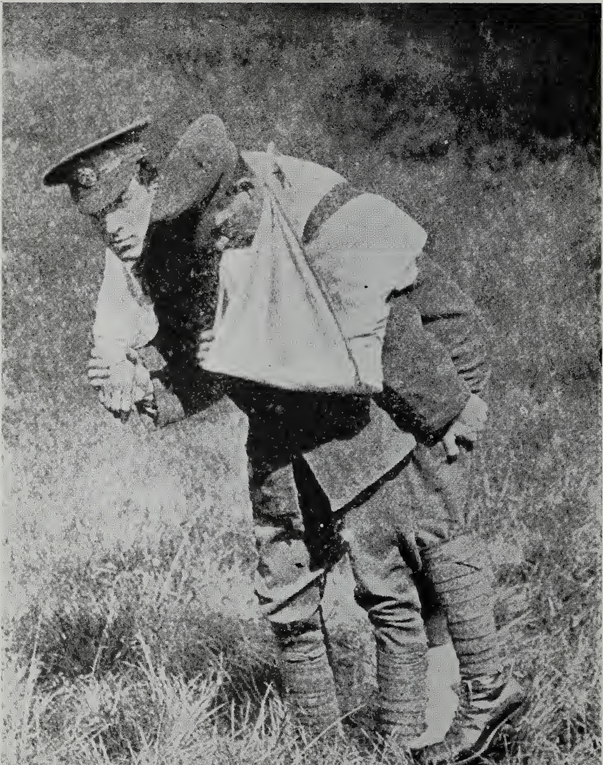

FIG. 17.—THE HUMAN CRUTCH—COMPLETE SUPPORT.

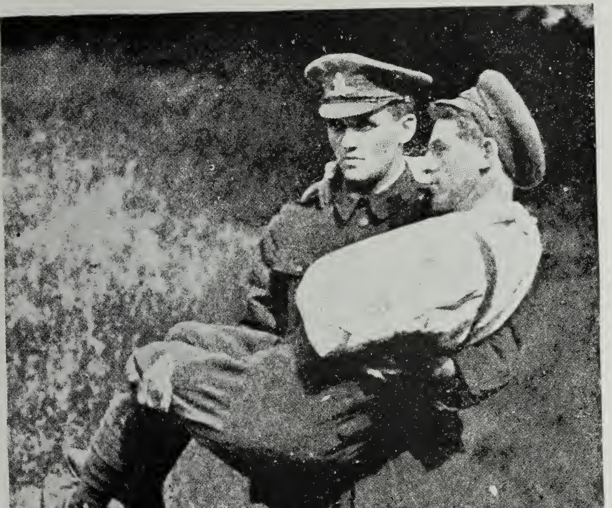

FIG. 18.—CARRYING WOUNDED IN THE ARMS.

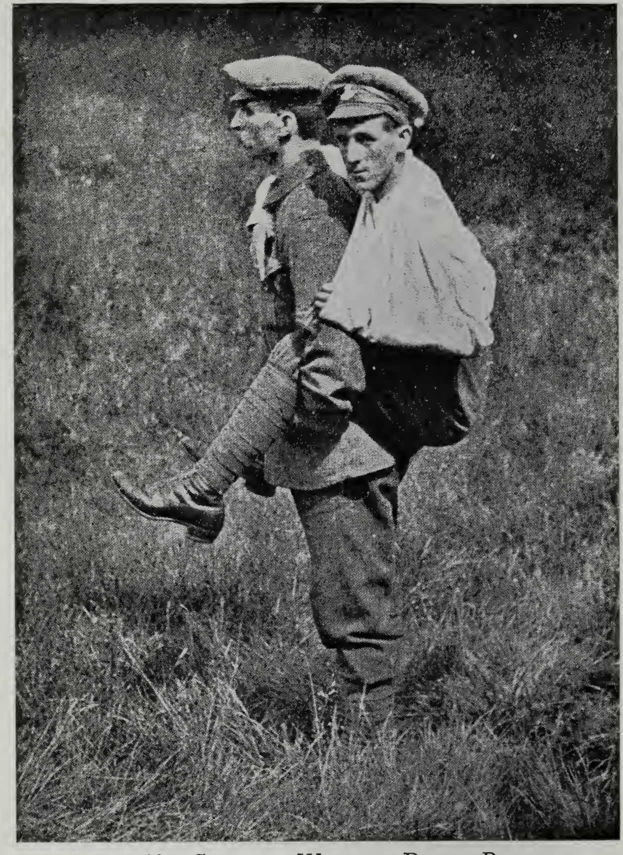

Fig. 19.—Carrying Wounded Pick-a-Back.

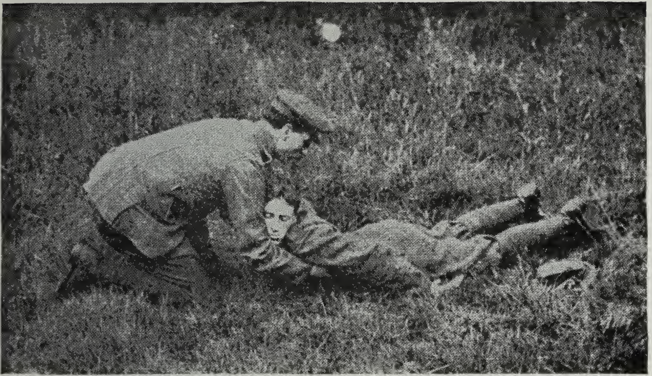

Fig. 20.—Fireman's Lift—First Position.

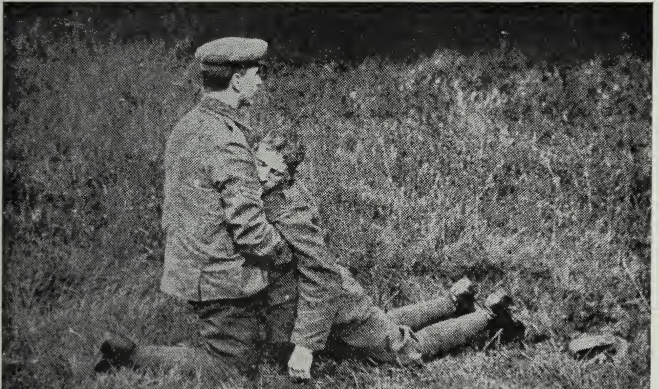

Fig. 21.—Fireman's Lift—Second Position.

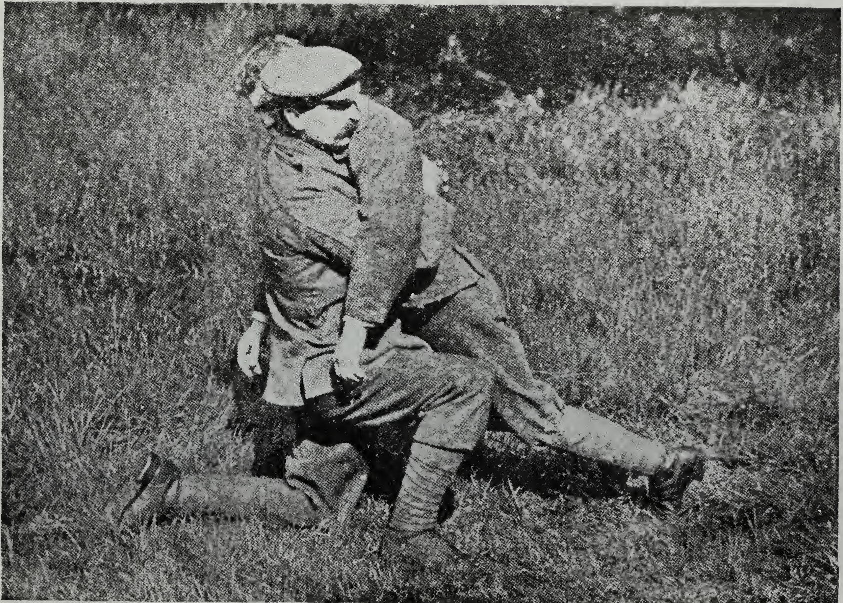

Fig. 22.—Fireman's Lift—Third Position.

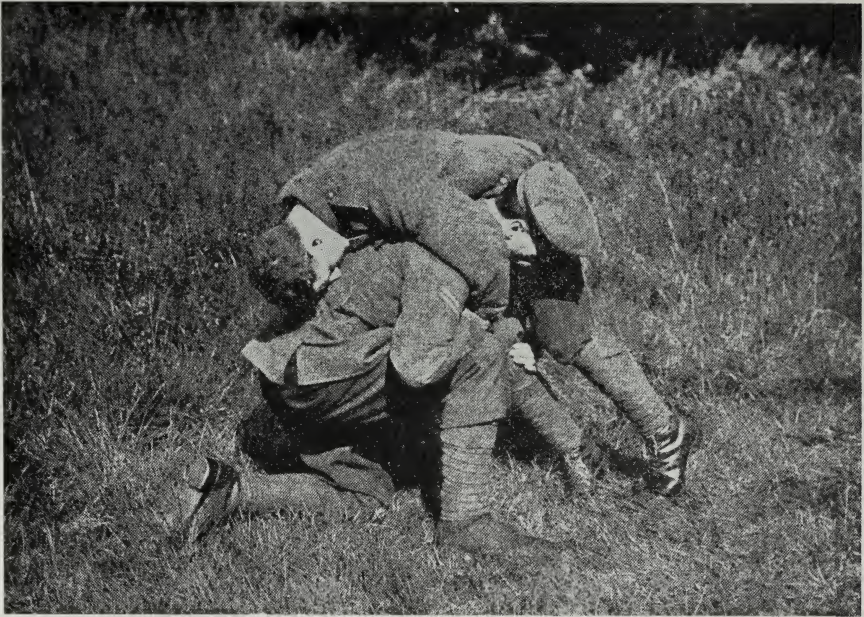

Fig. 23.—Fireman's Lift—Fourth Position.

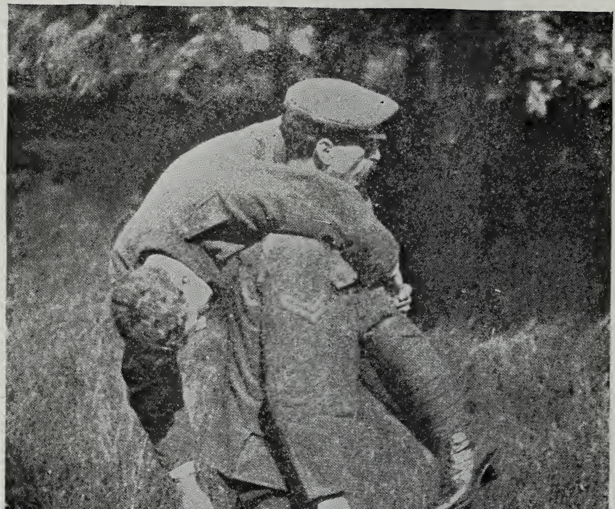

FIG. 24.—FIREMAN'S LIFT—COMPLETE.

ward, and thus get the injured man on your back like a sack of flour. The arm that went round his waist can now be brought behind him to steady him. In this way an injured person can be carried quite well for a short distance.

(2) *In the Arms* (Fig. 18).—When the patient is not very heavy he can be carried like a baby, one of your arms being under his knees, the other round his waist, and one of his arms round your neck. But where the injured man is unable to stand it is almost impossible to raise him from the ground to carry him in this way without help from some one else.

(3) *Pick-a-Back* (Fig. 19).—Kneel down while he gets on to your back, and tell him to hold on by your tunic and not to put his arms round your neck to choke you. As he has to hold on himself, one arm at least must be uninjured.

(4) *The Fireman's Lift* (Figs. 20–24) is especially useful for carrying an unconscious patient or where the ground is rough and difficult. Roll the man on to his face and put his arms to his sides. Kneel at his head, pass your hands beneath his armpits and pull him upwards towards you (Figs. 20, 21). Move your hands down him till they are at the

level of his waist, and locking them together behind him rise to a standing position (Fig. 22). Suddenly drop down on to your left knee, while seizing his left wrist with your right hand, so that his body falls across your left shoulder (Fig. 23). Put your left arm round both thighs and seize hold of his left hand. Rise to the standing position and adjust his weight on your left shoulder (Fig. 24). This is by far the best method of carrying a heavy unconscious patient. Over rough ground it is very useful to have the right hand free.

(5) *By Pulling along on the Ground.*—Though never desirable, it is sometimes necessary (if you can get no other help) to pull an injured man along the ground to get him to cover. First remove obstructions and then pull him head first by holding on to his tunic. Or pass a puttee behind his back and under each armpit, and pull him along by this; or even tie both ends to your belt and pull him in this way as you crawl along. If a leg or thigh is broken, first apply a splint; or if not obtainable, tie both legs and thighs together.

(*b*) Where there are *two people* to assist in removing an injured man—

(1) *A Temporary Trench Stretcher* (Figs. 25 and

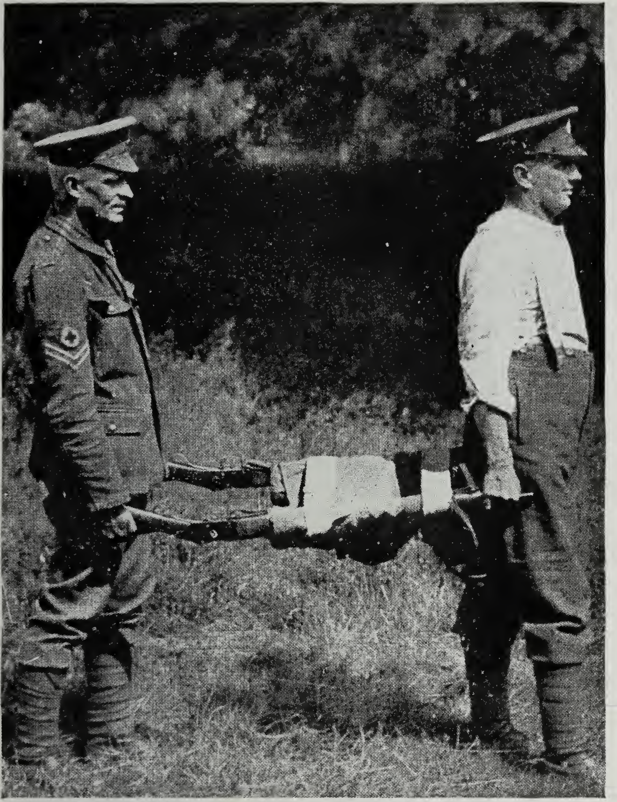

FIG. 25.—THE TEMPORARY TRENCH STRETCHER PREPARED.

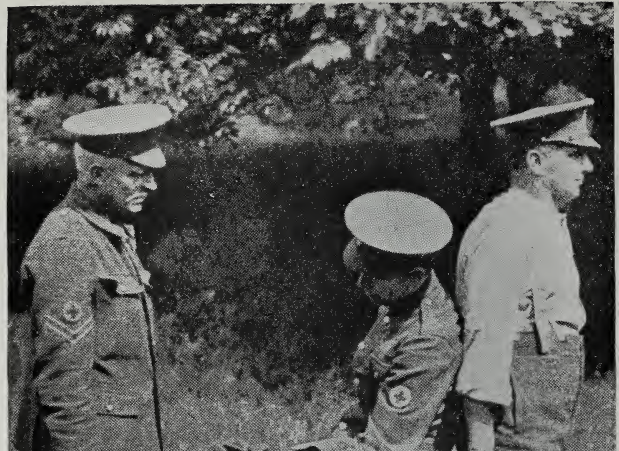

FIG. 26.—THE TEMPORARY TRENCH STRETCHER LOADED.

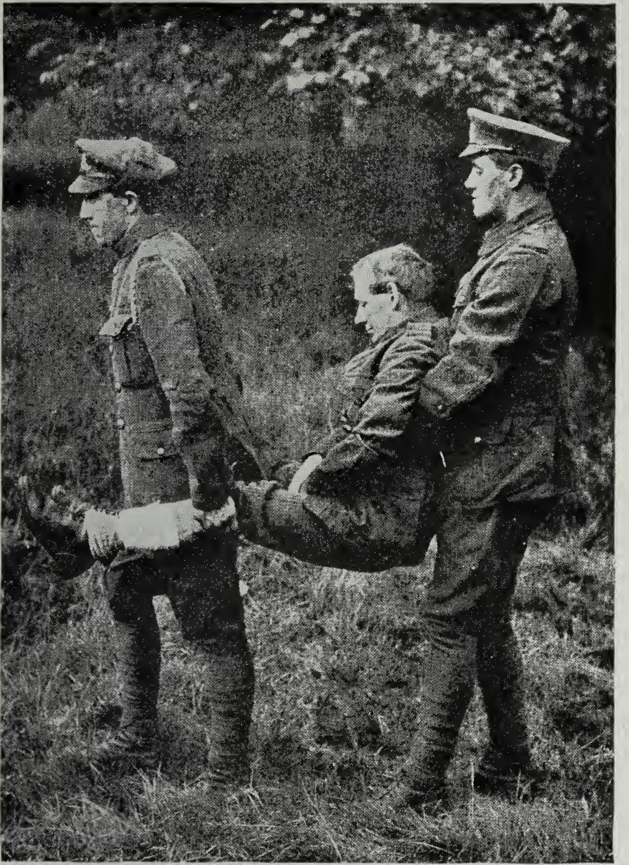

Fig. 27.—The Fore-and-Aft Carry.

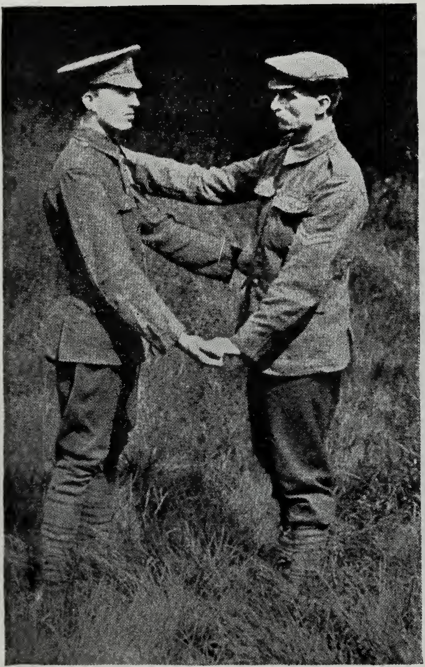

Fig. 28.—The Two Hand Seat.

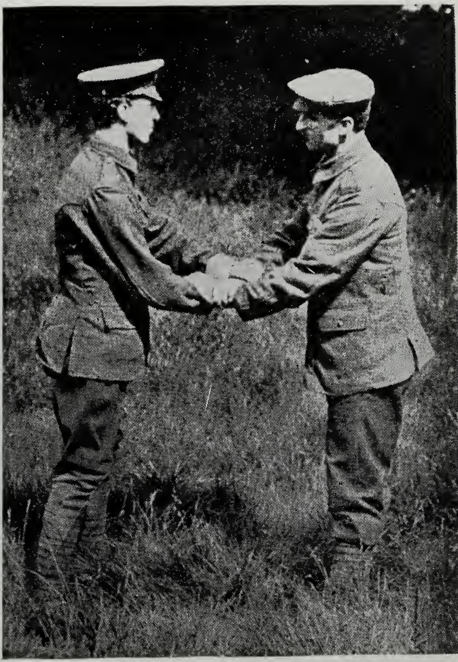

Fig. 29.—The Four Hand Seat.

26) can be made of a tunic and two rifles. Turn the sleeves of your tunic inside out as you take it off and button it up. Pass an unloaded rifle down each arm-hole. The injured man sits in the tunic with his back resting against that of the first bearer (Fig. 26). The whole thing is made much safer by putting a couple of belts round the tunic and rifles, buckles underneath. The method is suitable for most injuries where the patient is conscious and able to sit up. It can be used for a broken leg, but not for a broken thigh.

(2) *The Fore-and-Aft Carry* (Fig. 27).—The injured man sits on the ground with his legs a little separated from one another. One bearer stands behind him, and bending down passes his arms round the wounded man's chest below the armpits and locks his fingers in front. The other bearer stands between the patient's knees, and bending down catches hold of them. Both then rise together. The method is suitable for many not very severe injuries. Patients can be *very quickly picked up and carried to cover by it,* but as the rear bearer is doing most of the work it is very tiring for him.

(3) *The Two-Hand Seat* (Fig. 28).—The patient sits on the ground with the knees bent up. The

bearers stand facing one another on each side of him, and each passes a hand beneath his buttocks, hooking their fingers together beneath him. A back is made by one hand on the opposite shoulder and the other on the opposite hip. If the patient can use his arms he passes them round the bearers' necks. This is a great assistance to the bearers, although it is not absolutely necessary, as a back is provided by the bearers' arms. The method is only suitable for short distances.

(4) *The Four-Hand Seat* (Fig. 29).—As there is no back provided in this method the wounded man must have at least one arm free to put round a bearer's neck and hold on by. Each bearer seizes his *left* wrist with his right hand as they face one another; the hands are joined up and form a square. On this the patient sits. Or if he is unable to rise from the ground he raises himself a little by his hands, while the bearers' hands, after first being joined above him for practice, are locked beneath him. This method is much less tiring for the hands than the two-hand seat. But since the bearers have to take side steps, they are in both methods compelled to travel slowly.

(5) *The Rifle Seat* (Figs. 30 and 31).—The bearers

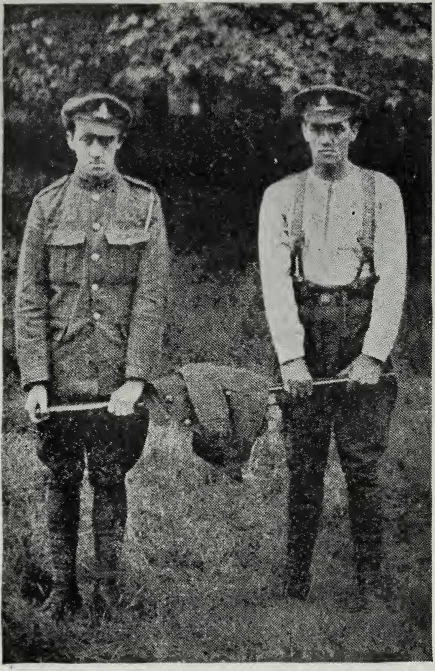

Fig. 30.—The Rifle Seat Prepared.

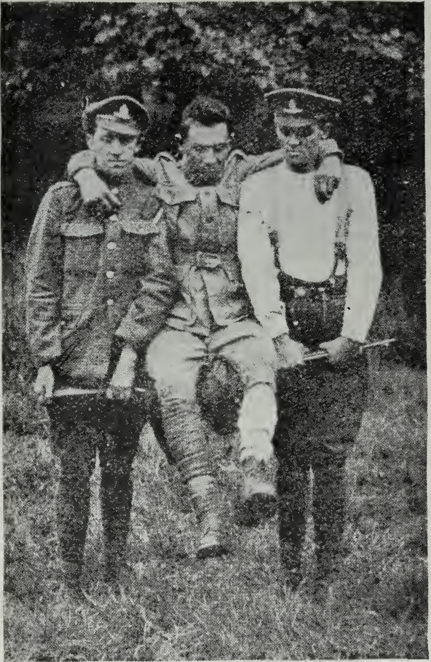

Fig. 31.—The Rifle Seat in Use.

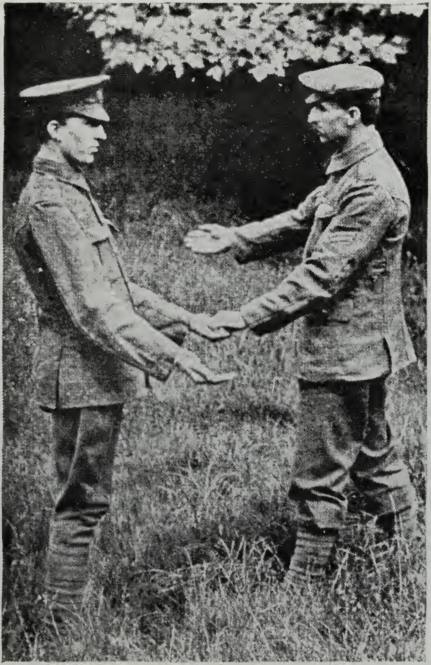

FIG. 32.—THE HUMAN STRETCHER.
UNLOADED.

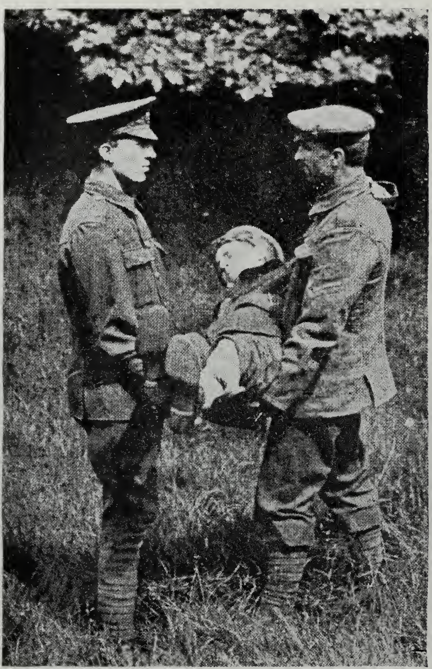

FIG. 33.—THE HUMAN STRETCHER.
LOADED.

stand side by side facing the same direction. They each take hold of opposite ends of an unloaded rifle, which they hold in front of them by both hands. On the middle of this is placed a folded tunic if time permits, and on this the patient sits with his arms round the necks of the bearers. As the bearers are facing the direction in which they are advancing they can walk easily, or even run.

(6) *The Human Stretcher* (Figs. 32, 33).—The bearers stand one on each side of the wounded man, facing him. Each half closes his left hand, and passing it beneath the upper part of the thighs of the wounded man they lock their fingers together. The right hands support the shoulders and legs respectively. A patient can be carried a short distance by this method. It is the most convenient method of loading a stretcher where there are only two bearers.

(*c*) With *more than two helpers* it is much easier to move a wounded man.

(1) *By Means of the Clothing* (Figs. 34, 35).—Three bearers kneel on each side of the patient. His tunic is unbuttoned and rolled up on each side. One bearer on each side takes hold of the rolled-up tunic at the level of the shoulders and places

the other hand beneath the head. The middle bearer on each side catches hold of the rolled-up tunic at the level of the waist, and with the other hand takes a good grip of the trousers at the side of the buttocks. The last two bearers support the thighs and legs by locking their fingers beneath them (Fig. 34). When every one is ready all rise together slowly and move off by taking short side steps (Fig. 35). A very severely wounded man can be raised in this way a few inches and a stretcher passed beneath him. Where the spine is injured two extra bearers gently pull on the head and feet to keep the spine straight while the patient is being raised for the stretcher or shutter to be pushed beneath him. With slight modifications this method can also be used when four bearers only are available.

(2) *The Blanket Stretcher* (Figs. 36, 37, 38).—A very useful stretcher can be made from a blanket, rug, or mackintosh ground sheet and two rifles or poles. The blanket is first placed beneath the patient. If he is severely injured this is best done by rolling up the blanket from one end and then placing it beneath the head as a pillow and gradually unrolling it from above (Fig. 36), gently raising the patient a little bit at a time as the blanket is

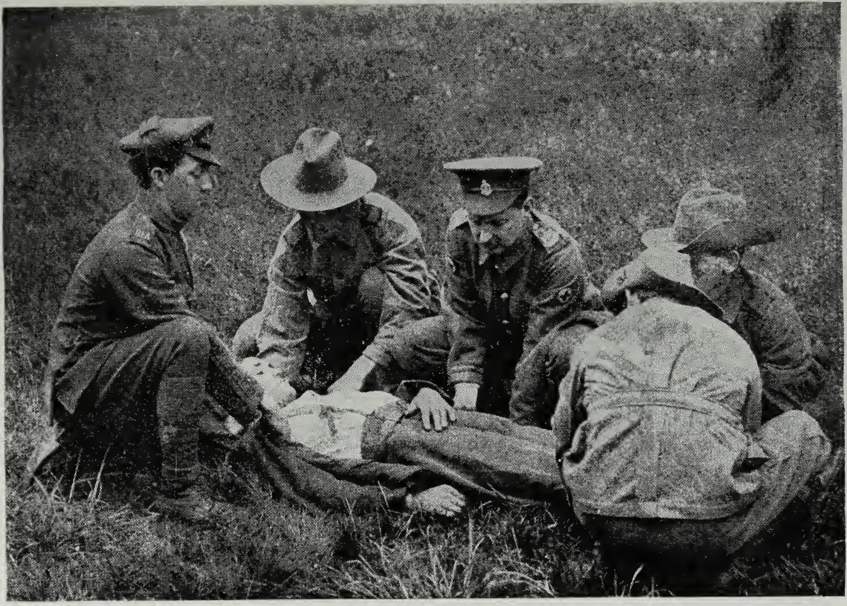

Fig. 34.—Carrying an Injured Patient by means of his Clothing. (a) Preparing to Lift (One Bearer is missing).

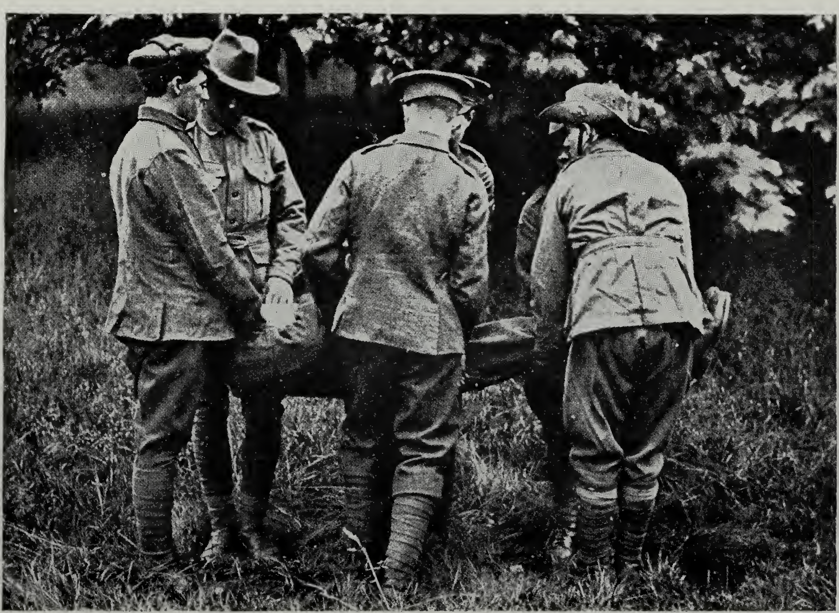

Fig. 35.—Carrying an Injured Patient by means of his Clothing. (b) Moving off.

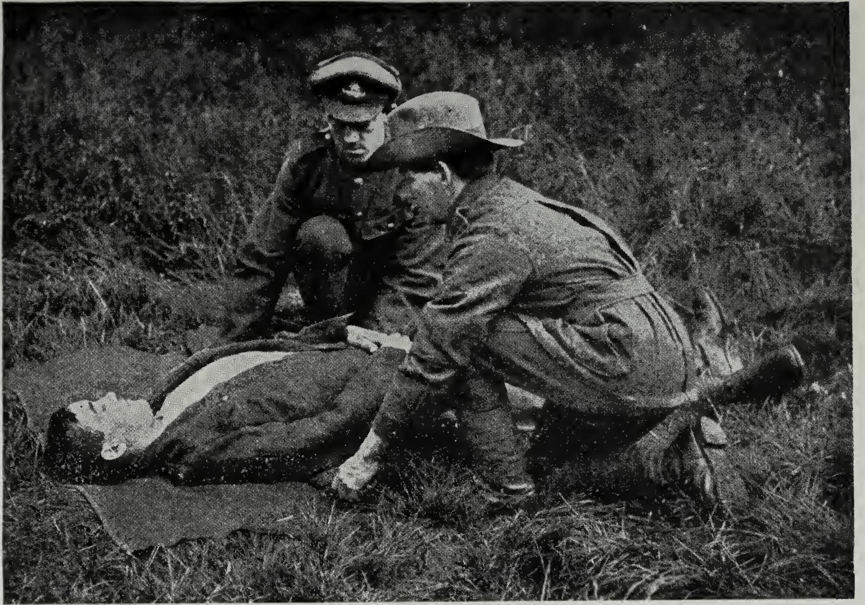

Fig. 36.—The Blanket Stretcher—(a) Unrolling Beneath Patient.

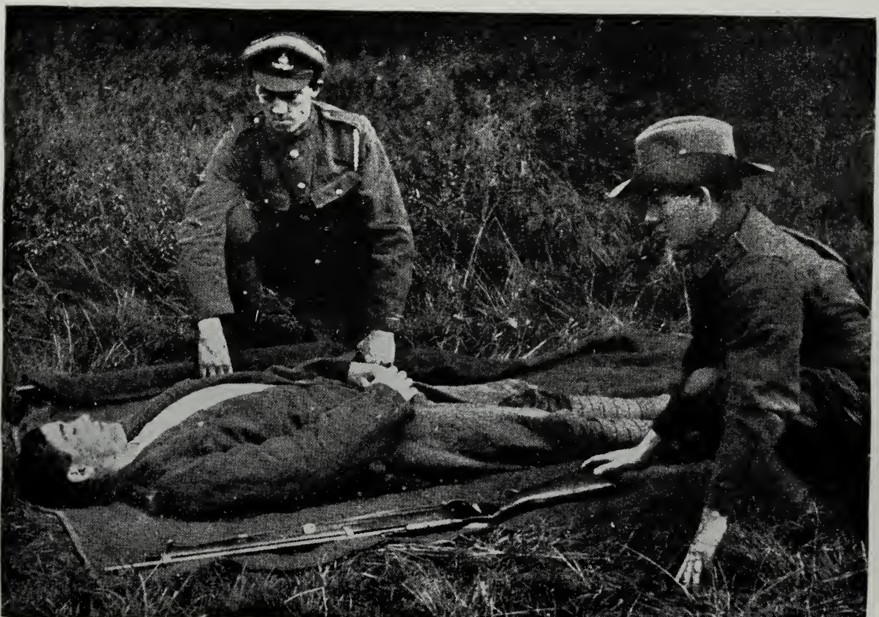

Fig. 37.—The Blanket Stretcher—(b) Rolling Blanket round Rifles.

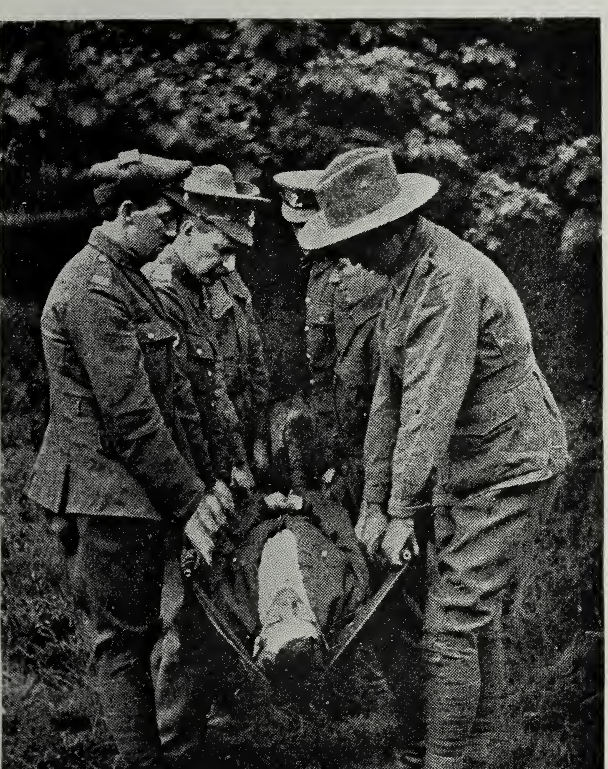

FIG. 38.—THE BLANKET STRETCHER—(c) MOVING OFF.

unrolled beneath him. A rifle is then placed on the edge of the blanket on each side of the wounded man (Fig. 37) and rolled up in the blanket until each rifle (covered by blanket) touches the patient. Two bearers take up their places on each side of the patient and lift him by means of the blanket-covered rifles while two others raise his legs (Fig. 38). The bearers pull against one another to keep the blanket tense and move off by short side steps, crossing their feet as they walk. Or the patient lying on a mackintosh sheet can be readily carried by bringing together the two sides of the sheet and lashing them to a long pole by ropes passed through the eyelet holes.

CHAPTER V

ON HEALTH IN THE TRENCHES

SOLDIERS on active service are especially liable to certain minor disorders, which can be prevented in almost all cases if sufficient care is taken.

Sore Feet.—New or ill-fitting boots are liable to cause blisters, and these, if not attended to, may easily become poisoned. Even with perfect fitting boots, dirty socks or dirty feet may easily produce soreness. The feet should therefore be washed, if possible, after every twenty miles marched, and the socks washed whenever they can be dried, and kept well darned. Socks which are too large or too small or form folds inside the boot are also liable to make the feet sore. At the close of a day's march the feet should be well washed with soap and water, thoroughly dried, and methylated spirit should then be dabbed on the soles and allowed to dry in and the feet then powdered. (The Medical Officer will supply you with powder if you ask him for it.) If blisters form, report to the Medical Officer, who will prick the blisters after first preparing the skin over them. Do not attempt to do this yourself.

Boils are very painful, and a great nuisance when on active service. To avoid them, (1) Never neglect an opportunity of a good wash all over with soap and water, especially if you can get hot water. (2) Keep the bowels well open every day, and do not mind asking the Medical Officer for a pill if you miss a day or feel you need one. (3) Do not eat too much meat. Eat vegetables and fruit whenever you can get them.

Soreness in the Crutch.—Men who perspire a lot, and especially those inclined to be rather stout, are often troubled by a soreness of the skin of the inner side of the upper part of the thigh, after a long march. Those who wear thick woollen pants are especially likely to be affected in this way. The trouble is best avoided by wearing thin cotton pants, washing the part every day with soap and water, drying thoroughly, and then powdering.

Trench Fever.—Slight feverish attacks occur in soldiers, and are due to a variety of causes. The use of dirty mess-tins is certainly one of these. An ordinary brick, heated red hot in a fire and then plunged into water, breaks up and forms a powder which is very useful for cleaning mess-tins.

Lice.—Body-lice are often a great nuisance on active service, and are liable to become of serious importance at any time, because it is believed that, in certain outbreaks of serious illness, it is lice that convey the disease from one individual to another. The body-louse lives in the underclothing, especially in the neighbourhood of the seams, and lays its eggs there. Body-lice are but rarely seen on the skin. It follows, therefore, that if a person troubled with these creatures takes a bath and puts on clean clothing he will be quite free from them. To free the underclothing, it should be boiled, or if this is impossible, ironed all over both sides with a hot flat-iron. It is said that wearing a bag of powdered sulphur next the skin is a useful preventative of lice.

FINAL SUGGESTIONS

It is suggested that you take with you in your pack or pocket the following articles, which will not materially add to the weight of your equipment, and may prove of real value to you.

(1) Several clean handkerchiefs. These are very useful for bandaging a wound or fixing on splints.

(2) A dozen large safety-pins are of use in making slings or fixing together torn clothing.

(3) Some pieces of stout string.

(4) A small roll of one-inch *rubber* adhesive plaster. Put a piece of this round a cut or scratched finger at once, before the dirt gets in. The plaster is also very useful for mending holes in ground sheets and mackintoshes.

(5) A box of rhubarb pills for constipation.

(6) A small bottle of five-grain tablets of Aspirin, or, to give it its full name, Aceto-salicylic acid. Take two every three or four hours to relieve headache, toothache, or the pain of any slight injury. They are quite harmless unless taken more often than here advised.

(7) A small tin of equal parts of powdered Boric acid and starch is useful for the feet and for soreness in the crutch.

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